

Topic SM213 – Respiratory Protection

Introduction

Respirators are a type of personal protective equipment that are worn over the mouth, nose, and sometimes the entire face, prevent the inhalation of dust, smoke, or other noxious substances. In 2019 the Bureau of Labor Statistics reported 3,360 total workplace injuries involving respiratory system illnesses due to toxic, noxious, or allergenic effects.

Respiratory Hazards

Respirators are used to provide protection against airborne hazards which potentially cause both acute (immediate) and/or chronic (long-term) effects such as lung damage, cancer and other diseases, or death. Examples:

- Harmful dusts (lead, silica, and other heavy metals)
- Fumes and smokes (welding fume)
- Gases and vapors (chemical exposure)
- Oxygen deficiency (oxidation, displacement, and consumption)
- Biological hazards (tuberculosis, whooping cough, flu viruses)

Respiratory Protection

It is important to remember that Elimination, Substitution, or Engineering Controls should first be explored. Only when engineering controls are not feasible should respirators be used. Before relying on PPE, consider the following:

- Is it possible to eliminate the toxic material or substitute a less toxic material?
- Is it feasible to enclose or confine operation?
- Is it sufficient to install general or local exhaust ventilation to make the job safer?

Employer Responsibility

Employers should develop and implement a written respiratory protection program that describes the proper worksite specific procedures and elements for required respirator use. The program should include procedures for:

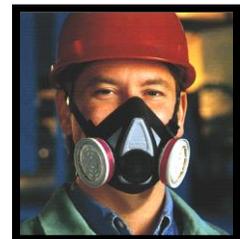
- Determine what hazards exist for each substance
 - Evaluate the conditions of exposure and the concentrations of the substance(s) in the air
 - Verify that there is an adequate oxygen level in the air
- Select and provide the correct respirator based on the hazards
- Training in the use and care (cleaning, sanitizing, inspecting, storing) as well as record keeping

Types of Respirators

Respirators work by either filtering particles from the air, chemically cleaning (essentially purifying) the air, or supplying clean air from an outside source. There are two major classes of respirators:

1. **Air-Purifying Respirators** remove contaminants from the air:

- **Particulate Respirator**
 - Filter out dusts, fumes, and mists
 - Are usually disposable dust masks or respirators with disposable filters
 - And must be replaced when they become discolored, damaged, or clogged
 - Examples: filtering facepieces or elastomeric respirators
- **Chemical Cartridge/Gas Mask respirator**
 - Uses replaceable chemical cartridges or canisters to remove the contaminant
 - Are color-coded to help you select the right one
 - May require more than one cartridge to protect against multiple hazards
- **Powered Air-Purifying Respirator**
 - Use a fan to draw air through the filter to the user
 - Need a fully charged battery to work properly
 - They use the same type of filters/cartridges as other air-purifying respirators
 - Need to know how much hazard is in the air to select the proper filters/cartridges



Topic SM213 – Respiratory Protection

2. **Atmosphere-Supplying Respirators** provide clean, breathable air from an uncontaminated source:

- **Supplied Air Respirator (SAR)**

- Provides breathing air from a separate uncontaminated environment, not carried by the user
- Supplied to the respirator through an airline
- Use when the hazardous substance has little odor, taste, or warning properties
- Use when the hazardous substance exists in high concentration or toxicity

- **Self-Contained Breathing Apparatus (SCBA)**

- Provides clean air from a portable air tank when air in the atmosphere is too dangerous to breathe
- Protect against higher concentrations of dangerous chemicals
- Very heavy (30 pounds or more) and require very special training on how to use and maintain
- Air tanks typically last an hour or less depending on the rating and your breathing rate



Maintenance

Respirators must be inspected before and after every use. Following each use, respirators should be cleaned, disinfected, and stored according to the manufacturer's instructions:

- All parts should be clean and working properly
- Check the face-piece for dry rot, cracks, and holes
- Perform a leak check
- Replace valves and hose if cracked, brittle or punctured
- Check head harness for damage or deterioration
- Tighten loose clamps and connectors
- Check for proper filter selection and placement
- Replace damaged or clogged filters

Ensure that employees keep track of their respirators so that they do not use someone else's by mistake.

Medical Evaluation

The use of a respirator may place a physical burden on an employee:

- A medical evaluation must be provided to determine the ability of the employee to use a respirator before fit tests are conducted and employee is authorized the use of a respirator
- Identify a physician or other licensed health care professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical evaluation with which the same information is obtained

Program Evaluation

The employer shall conduct evaluations of the workplace to ensure the written program is being properly implemented and consult with employees to make sure that respirators are being used properly. Any problems that are identified during this assessment shall be corrected.

Conclusion

Respirators work by either filtering particles from the air, chemically cleaning (essentially purifying) the air, or supplying clean air from an outside source. OSHA governance is provided in 29 CFR 1910, Subpart I. **Always follow your company's policies and procedures.**

❖ **Any questions about the information in today's meeting?**

❖ **Does anyone have comments or feedback?**

